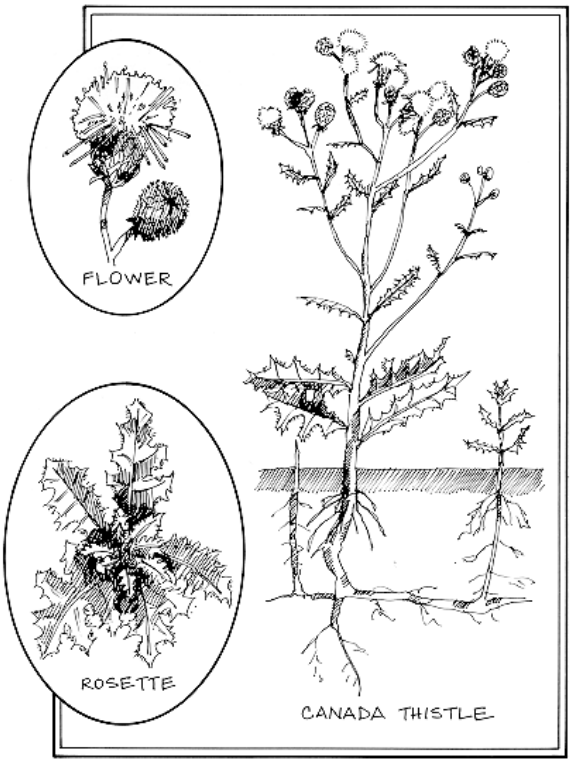
**CANADA THISTLE**
***Cirsium arvense***




**Life History/Identification:**

Canada thistle is an aggressive, creeping perennial weed that infests crops, pastures, roadsides, rangeland, and non-crop areas. It develops from seed or vegetative buds in its root system. Horizontal roots may extend 15 feet or more and vertical roots may voyage 6 to 15 feet deep into the soil. Canada thistle emerges from its root system in middle to late spring and forms rosettes. These rosettes have four true leaves with spiny tips and green, wavy leaves. The greatest flush of root-derived plants occurs in the spring, but another flush occurs in autumn. When moisture is adequate, a smaller flush can crop up at any time during the growing season, for example during our late summer rains. Plants that germinate from seed do so at about the same time as root-derived plants. Seedlings grow slowly and are sensitive to competition, particularly if they are growing in a shaded stretch of land. If the seedlings can survive for 7 to 8 weeks, however, they develop the ability to reproduce from their root systems. Canada thistle usually grows to be about 2 to 3 feet tall with alternate, dark green leaves that vary in size. The leaves are generally oblong, deeply lobed, and have spiny-toothed edges. Canada thistle begins to flower in late spring to early summer in response to long hours of sunlight. Plants are male or female (dioecious) and grow in circular patches that are often one clone and sex. Cross-pollination is necessary for seed production. The species develops seed rather sparingly, with an average of about 1,000 to 1,500 seeds per plant. Generally, vegetative production from its root system contributes to local spread and seed production contributes to long-distance dispersal. One difficult aspect about the identification of Canada thistle is that it has been classified into several varieties, distinguished mainly by leaf shape, size, and abundance of leaf spines. Many ecotypes (a population of plants from a certain location with specific traits) of the thistle also exist and differ in growth, life cycle, and susceptibility to herbicides and cultivation.

**Flagstaff Localities:**

Canada thistle is considered a noxious weed in at least 35 states and much of Canada, but it grows best in the northern regions of North America where temperature and rainfall are moderate. It is most competitive in deep, well-aerated, productive, cool soils. The species is estimated to infest 800,000 acres of land in northern and western Nebraska. In the Flagstaff area, Canada thistle has only been identified off of Butler Avenue and in Switzer Canyon. Various control methods have been used on the infestations, and they are being monitored for any additional growth.

**Economic Impact:**

Though its name would indicate otherwise, Canada thistle is a native of the Mediterranean region and southeast Europe. Canada thistle is also found in China and Japan and has spread so extensively that it is difficult to distinguish the plant's original native range. It was probably introduced to the United States in contaminated hay and grain seed during the early colonization of the 17th century. Today, this persistent weed is a devastating force in agricultural production and millions of dollars are spent trying to control its spread. Heavy infestations of Canada thistle growing in corn,

soybeans, and wheat have been shown to reduce crop yields by 81, 95, and 60 percent, respectively. Heavy infestations growing in pasturelands can reduce native grass production by as much as 60 percent. It also harbors insects and is an alternative host for some disease-causing organisms.

**Control:**

The key principle to controlling Canada thistle is to stress the plant and force it to use stored root nutrients. It has the capacity to recover from most stress, however, and returning infested land to a productive state only occurs over time. It is essential to develop a sound management plan that is implemented over several years to ensure success. Practical prevention is the most effective and least expensive method of control. Do not drive through areas infested with Canada thistle. Check all vehicles, machinery, and farm equipment for attached portions of the plant when leaving an infested site. Do not purchase hay that is not certified as being weed-free.

Cultural Control:

The elimination of seed production, seedling growth, and established perennial plants is necessary to obtain long-term control. Seeds remain viable in the soil for several years, so the prevention of seed production is the first step in controlling Canada thistle. Competition with other plants can be used to stress this weed, particularly the seedlings, and, when used in conjunction with another control technique, can successfully treat an infestation. Grasses and alfalfa can compete effectively with Canada thistle. Keep in mind, however, that competition alone is seldom effective against this aggressive pest.

Mechanical Control:

Cultivation alone can control Canada thistle if the tillage begins at flower bud time and is repeated every 10 days throughout the season. Two consecutive years of cultivation are required to successfully control Canada thistle. Late fall moldboard plowing will bring some roots to the soil surface, exposing them to cold temperatures and dehydration. The spring emergence will also be delayed since the late fall shoots are destroyed by moldboard plowing. Mowing can be an effective tool if combined with herbicide treatments. Prescribed burning may be a useful means of slowing the spread of Canada thistle, if Flagstaff's biannual rainfall and the plant's life cycle are taken into consideration.

Chemical Control *(Noted here are chemical control techniques that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council or The Nature Conservancy.)*:

1) In the spring, when Canada thistle is 10 to 15 inches tall, apply 2,4-D at two quarts per acre. Then re-treat in the fall with Banvel™ (chemical name: dicamba) at two quarts per acre. Use a surfactant (.25 percent to 0.5 percent v/v) for adequate control. Banvel™ may also be used in the early spring when the weed is in the rosette stage.
2) Apply Curtail™ (clopyralid plus 2,4-D) at 2 to 3 quarts per acre when the oldest Canada thistle plants are entering the bud growth stage and the youngest are in the rosette stage. Research has shown that mowing along with Curtail™ improves performance.
3) Transline™ (chemical name: clopyralid) is effective when the thistle is in the rosette to bud growth stages and during the early fall at one pint per acre.

Biological Control *(No exotic species should be introduced into an ecosystem without extensive research into the long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.)*:

Several biological control agents will suppress Canada thistle to a limited extent. Four insect and one fungi species are currently being tested for release in Montana, Idaho, North Dakota, and Washington. A weevil is being used in Colorado that bores into the plant's crown area. If the population of the weevil is high enough, plant death can occur.

**Note: No single control method, or any one-year treatment program, will ever achieve effective control of an area contaminated with Canada thistle. The perennial root system, diverse habitat, and aggressive nature of this plant require long-term cooperative integrated management programs and planning to prevent and reduce Canada thistle infestations.**

Moser, L; D. Crisp. San Francisco Peaks Weed Management Area fact sheet on Cirsium arvense. Coconino National Forest.